REMARKS/ARGUMENTS

Claims 1-18 are now pending in this application.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 102 AND § 103

I. Claims 1-5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Frannhagen (USPN 5,990,659).

II. The rejections are respectfully traversed.

The Examiner maintains that "tag" (as recited in the claims) is interpreted to include everything within the (battery) pack (10) [of Frannhagen] except the battery cells. However, what is recited in the claims is "a ***wireless tag*** provided on the battery". "Wireless tag" is a term of art and refers to a "tag" that provides information (contained in the tag) as radio (frequency) transmission via the airwaves. An example of such a tag is a RFID:

> **Radio Frequency Identification (RFID)** is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Chip-based RFID tags contain silicon chips and antennas. Passive tags require no internal power source, whereas active tags require a power source.

Page 16, lines 23-24 of the present application describes:

> ...As shown in Fig. 6, a wireless tag 32 in the form of a chip in which information on each battery 16 is stored

Via such description, a person of ordinary skill in the art, armed with the present disclosure, would understand that "wireless tag", as used in the present application, refers to storing information and sending such stored information in a radio transmission via the airwaves.

As additional evidence of what is intended by "wireless tag", attention is directed to USPN 6,973,716, filed December 11, ***2003***, which was a division of U.S. patent application Ser. No. 10/191,580 filed Jul. 9, ***2002***, where column 1, lines 9-18 describe:

> Electronic identification and tracking of articles, persons, transactions and the like is becoming more prevalent, and ***the identification devices that include an electronic device utilized for such identification and tracking are variously referred to as*** smart tags, smart cards, RF tags, RFID tags, wireless cards, ***wireless tags***, contact cards and tags, and the like. Identification devices for certain utilizations such as credit cards, debit cards, cash cards, driver's licenses, are of controlled size and often are relatively rigid and/or inflexible. (Emphasis Added)

USPN 6,563,463, filed May 24, 2000 and issued May 13, 2003, describes at column 1, lines 4-6:

> The present invention relates to a ***wireless IC tag*** using a radio frequency of sub-microwave band and having no battery. (Emphasis Added)

Thus, a person of ordinary skill in the art understands what is intended by "wireless tag" and such "wireless tag" is not disclosed or suggested in Frannhagen. More specifically, information contained within the Frannhagen battery pack 10 is read out as asynchronous voltage variations across the battery voltage terminals 14 and 16. Clearly, such asynchronous voltage variations across the battery voltage terminals 14 and 16 are not information stored in the wireless tag that is sent as a radio transmission (e.g., a radio frequency) via the airwaves, as is understood in the art would be provided by "wireless tags". Furthermore, battery cell 22 is the battery enabling generation of such asynchronous voltage variations across the battery voltage terminals 14 and 16. As noted above, a passive "wireless tag" has no battery for providing the radio transmission (e.g., radio frequency).

It should be noted also that there are advantages in using a wireless tag, which are not recognized or contemplated by Frannhagen. Such advantages include, for example, the information can be obtained without any contact with the wireless tag, the information can be immediately obtained when the battery is set, and the information can be obtained with any type of battery.

The above-argued differences between the claimed device vis-à-vis the device of Frannhagen undermines the factual determination that Frannhagen identically describes the claimed inventions within the meaning of 35 U.S.C. § 102. ***Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.,*** 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); ***Kloster Speedsteel AB v. Crucible Inc.,*** 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986). Applicants, therefore, submit that the imposed rejection of claims 1-5 under 35 U.S.C. § 102 for lack of novelty as evidenced by Frannhagen is not factually or legally viable.

II. Claims 1-5 and 12-18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Rohde (USPN 6,005,367).

The rejections are respectfully traversed.

As noted above, the claims require "a ***wireless tag*** provided on the battery". Rohde discloses at column 3, lines 31-34:

> ...a non-volatile memory storage integrated circuit (IC) 14 which includes ***a 1-wire serial data communication interface***. (Emphasis Added)

Thus, this IC 14 is **NOT** within the above-mentioned meaning of the claimed "wireless tag" as recited in independent claims 1, 12 and 15-18. Applicants, therefore, submit that the

imposed rejection of claims 1-5 and 12-18 under 35 U.S.C. § 102 for lack of novelty as evidenced by Rohde is not factually or legally viable also.

III. Claims 6-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Frannhagen in view of Rohde.

The rejections are respectfully traversed.

Independent claims 6, 7, 8 and 11 each require "a ***wireless tag*** provided on the battery". As noted above, neither Frannhagen nor Rohde disclose a "wireless tag" as known in the art. In addition, as neither Frannhagen nor Rhode use a wireless tag, they do not acknowledge the problem(s) to be solved in by the present invention. Such problem is described at pages 1-2 of the present application.

In this regard, it should be understood that the problem addressed and solved by a claimed invention must be given consideration in resolving the ultimate legal conclusion of obviousness under 35 U.S.C. § 103. ***North American Vaccine, Inc. v. American Cyanamid Co.,*** 7 F.3d 1571, 28 USPQ2d 1333 (Fed. Cir. 1993); ***In re Newell,*** 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Consequently, independent claims 6, 7, 8 and 11, as well as dependent claims 9 and 10, are patentable over Frannhagen and Rohde, considered alone or in combination.

IV. In view of the above, the allowance of claims 1-18 is respectfully solicited.

CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Edward J. Wise (Reg. No. 34,523) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____

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Attachments: Radio Frequency Identification (definition)
USPN 6,973,716 (columns 1 and 2)
USPN 6,563,463 (columns 1 and 2)

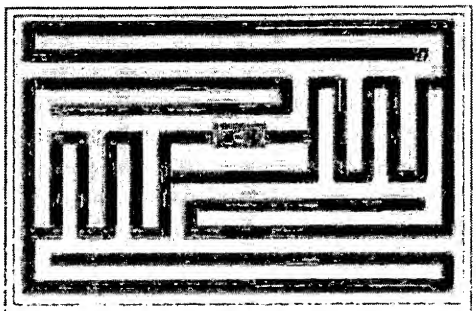
MSW/EJW/vd

Radio Frequency Identification

From Wikipedia, the free encyclopedia
(Redirected from RFID)

Some information in this article or section has **not** been **verified** and may not be reliable.
Please **check for any inaccuracies**, and modify and **cite sources** as needed.

Radio Frequency Identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Chip-based RFID tags contain silicon chips and antennas. Passive tags require no internal power source, whereas active tags require a power source.



An EPC RFID tag used for Wal-Mart

ELECTRONIC CIRCUIT CONSTRUCTION METHOD, AS FOR A WIRELESS RF TAG

This application is a division of U.S. patent application Ser. No. 10/191,580 filed Jul. 9, 2002, now U.S. Pat. No. 6,665,193 issued Dec. 16, 2003.

The present invention relates to a method for making an electronic article.

Electronic identification and tracking of articles, persons, transactions and the like is becoming more prevalent, and the identification devices that include an electronic device utilized for such identification and tracking are variously referred to as smart tags, smart cards, RF tags, RFID tags, wireless cards, wireless tags, contact cards and tags, and the like. Identification devices for certain utilizations such as credit cards, debit cards, cash cards, driver's licenses, are of controlled size and often are relatively rigid and/or inflexible.

A prior art wireless tag includes a spiral antenna on a substrate and an electronic device, typically an electronic chip or integrated circuit, connected to an antenna. Where the antenna has only one or two turns or loops, the electronic device may be mounted directly over and straddling the antenna because the distance between the contacts of the electronic device is greater than the distance between the terminals of the antenna. An example thereof is illustrated in FIGS. 15–16 of U.S. Pat. No. 6,404,643 issued Jun. 11, 2002, to Kevin Kwong-Tai Chung.

In a more common example, however, owing to a larger number of turns or loops of the spiral antenna and/or of the width and spacing thereof, the distance between the antenna terminals is substantially greater than is the spacing of the contacts of the electronic device. Connection across antenna 20 may be a conductor on the opposite side of substrate 12, as illustrated, for example, in FIGS. 2, 3A–3B and 6–8 of U.S. Pat. No. 6,353,420 issued Mar. 5, 2002, to Kevin Kwong-Tai Chung.

For many "high-volume" or "high-quantity" utilizations, however, such as product tags, inventory tags, anti-theft tags, laundry tags, baggage tags and the like, the tags may be used only one or two times before being discarded. The tags described in the aforementioned U.S. patents are very suitable for such utilizations, but are usually much more durable and robust than is necessary for single-use tags. Other prior art tags tend to employ multiply-layered substrates, complicated connection and interconnection arrangements, and the like, which tend to make them too expensive for use in a tag that is disposed of after only one or two uses.

The cost of the identification tag could be reduced if a thinner, more flexible and inexpensive substrate were to be used. One significant problem associated with a thinner, more flexible substrate material is that it lacks the "dimensional stability" of the thicker higher-cost substrate materials and tends to curl and ripple rather than remaining planar or "flat" as do stiffer substrates. As a result, it becomes very difficult to place and solder electronic devices on such thin, flexible substrate materials with sufficient accuracy of contact registration to consistently produce acceptable identification devices, even when highly accurate "pick-and-place" automated assembly equipment is utilized. This problem becomes worse when making tags having different sizes and configurations, particularly smaller tags.

Accordingly, an electronic circuit arrangement for an identification tag employing a thin, flexible substrate would be desirable. In addition, it would be desirable that such

arrangement could utilize automated assembly, and yet could still be of sufficiently low cost as to be disposable.

To this end, the method of the present invention for making an electronic article comprises

providing an insulating substrate having an electrical conductor thereon including first and second contact sites spaced apart substantially a predetermined distance;

providing an insulating electronic circuit substrate having a length substantially the predetermined distance, having first and second contact sites substantially at first and second ends thereof, and having first and second terminals respectively connected to the first and second contact sites thereof;

mounting an electronic device to the electronic circuit substrate with first and second contacts of the electronic device connected to the first and second terminals of the electronic circuit substrate; and

then mounting the electronic circuit substrate to the insulating substrate with the first and second contact sites of the substrate electrically connecting with the first and second contact sites of the electronic circuit substrate.

BRIEF DESCRIPTION OF THE DRAWING

The detailed description of the preferred embodiments of the present invention will be more easily and better understood when read in conjunction with the FIGURES of the Drawing which include:

FIG. **1** is a plan view of an RF tag employing an electronic device and an electrical jumper;

FIGS. **2A**, **2B** and **2C** are plan views of three example embodiments of a circuit arrangement each including an electronic device on an electronic circuit jumper;

FIGS. **3** and **4** are a plan view and a side cross-sectional view, respectively, of an example embodiment of the electronic circuit jumper of FIGS. **2A–2C**;

FIGS. **5** and **6** are cross-sectional views of alternative example mounting arrangements of the electronic circuit jumper of FIGS. **3** and **4** on the circuit arrangements of FIGS. **2A–2C**;

FIGS. **7A**, **7B** and **7C** are cross-sectional views illustrating steps in the making of the electronic circuit arrangement of FIGS. **3–4**; and

FIG. **8** is a cross-sectional view illustrating a step in the making of the circuit arrangement of FIGS. **2A–2C**, **5** and/or **6**.

In the Drawing, where an element or feature is shown in more than one drawing figure, the same alphanumeric designation may be used to designate such element or feature in each figure, and where a closely related or modified element is shown in a figure, the same alphanumerical designation primed may be used to designate the modified element or feature. It is noted that, according to common practice, the various features of the drawing are not to scale, and the dimensions of the various features may be arbitrarily expanded or reduced for clarity.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

FIG. **1** shows an example of an RP wireless tag **10**. Tag **10** includes a spiral antenna **20** on a substrate **12** having antenna terminals **22**. Terminals **52** of electronic device **50**, typically an electronic chip or integrated circuit **50**, are too close together to be connected to terminals **22** of antenna **20**. To connect across the turns of antenna **20**, an electrical "jumper" conductor **40** is utilized. Jumper **40** includes a dimensionally-stable substrate having an electrical conduc-

WIRELESS TAG, ITS MANUFACTURING AND ITS LAYOUT

The present invention relates to a wireless IC tag using a radio frequency of sub-microwave band and having no battery. A detailed description is given of a conventional wireless IC tag using the radio frequency band and having no battery in Shinichi Haruyama, "Technologies for microwave ID card system", the supplement of Japanese magazine "Transistor -Gijujtsu" published by CQ Publishing Co. Ltd., pp. May 21–29, 1992. In a rectenna (circuit comprising an antenna and a rectifying circuit) of a wireless IC tag described in the paper, there is introduced an antenna as shown by FIG: 1 comprising a series connection of a half-wavelength resonator and a shottky barrier diode. FIG. 1 shows the rectenna circuit, numerals 1 and 2 designate quarter-wavelength antennas, numeral 3 designates a shottky barrier diode, numerals 4 and 5 designate inductors, numeral 6 designates a condenser and numeral 7 designates an output terminal. Microwave power received by the ¼ wavelength type antennas 1 and 2 is rectified via the shottky barrier diode 3 and the inductor 5 and is accumulated in the capacitor 6 as direct current and is outputted from the output terminal 7 as necessary. Further, there is described an example of utilizing a rectangular microstrip-patch antenna in AIM Japan, "Technologies and applications for data carrier" published by THE NIKKAN KOGYO SHIMBUN, LTD. pp. Oct. 22–25, 1990. FIGS. 2A, 2B and 2C show t he example of the rectangular microstrip-patch antenna in which FIG. 2A is a plane view, FIG. 2B is a side view and FIG. 2C shows a rear face. In FIGS. 2A, 2B, 2C, numeral 8 designates a rectangular patch, numeral 9 designates a dielectric member, numeral 10 designates a ground conductor, numeral 11 designates a feed line and numeral 12 designates a feed point. A microwave signal inputted from the feed line 11 is resonated at a frequency determined by a length "l" of a side of a square shape including the feed point 12 of the rectangular patch 8. According to these antennas, when the losses of the member is reduced to reduce loss of the antenna, the Q of the resonating circuit becomes high and a matching frequency band is narrowed. When the Q of the resonator is increased, it is difficult to widen the matching frequency band of the antenna

According to a wireless IC tag, voltage generated by rectifying current is changed in accordance with a distance between the wireless IC tag and an interrogator antenna and when the wireless IC tag becomes proximate to the interrogator antenna, the rectifying voltage is rapidly elevated. Therefore, in view of the withstanding voltage of an IC, a voltage value is devised to be maintained at a predetermined value or lower by a voltage limiter comprising transistors connected in multiple stages in Japanese Laid-open Patent (Kokai) No. Hei 8-185497. Further, a result of communicating with the wireless IC tag is produced by data of the wireless IC tag absorbed from the interrogator.

With regard to a structure of a dipole antenna for electrically connecting and packaging an antenna of a wireless IC tag and an IC circuit, in "manufacturing method for wireless tag" disclosed in Japanese Laid-open Patent (Kokai) No. Hei 10-32214, there is described a method of mounting a structure in which an IC is attached to a strip-like antenna having a lead frame structure and an IC attaching portion thereof or a total thereof including the antenna is integrated by a mold technology such as transfermolding.

SUMMARY OF THE INVENTION

According to the conventional technologies, it has been difficult to widen a matching frequency band by promoting a sensitivity of the antenna of the wireless IC tag. It is an object of the present invention to achieve wide band formation without deteriorating the sensitivity of an antenna to thereby facilitate to manufacture the antenna by promoting the yield against the manufacturing dispersion by constituting the wide band formation of the antenna.

It is another object of the present invention to realize a circuit constitution in place of a low voltage circuit maintained at predetermined voltage by wastefully consuming current by using a transistor, a zenner diode or the like, for carrying out operation of confirming transmittance of data between a wireless IC tag and an interrogator by using power dissipated in the previous low voltage circuit without checking and determining by the data of the wireless IC tag read by the interrogator.

It is another object of the present invention to manufacture of a wireless IC tag of an integrated type by filling and molding a mold material of a transfer mold or the like as a dielectric material of an antenna in a microstrip-line constitution while ensuring electric connection between IC and the antenna and ensuring also mechanical strength in the antenna for the wireless IC tag in the microstrip structure comprising a ground conductor plate constituted by a lead frame and an antenna conductor.

In order to widen a matching frequency band without deteriorating the sensitivity of an antenna of a wireless IC tag, there is achieved wide band formation by double tuning by constituting an antenna of a double tuned type in which quarter-wavelength antenna resonators in a microstrip constitution are subjected to mutual inductance coupling by an impedance element comprising a common inductor. For that purpose, there is adopted an antenna structure for grounding a middle point of a half-wavelength antenna by using a through hole conductor with a ground face of a microstrip substrate or a lead frame conductor. There is constructed an integrated structure by mechanically and/or electrically connecting IC to a surface of an antenna constituted by a lead frame conductor on a side of a ground face by using an insulating adhering agent or a conductive adhering agent and pressurizing and solidifying a mold member for transfer mold of the lead frame integrally connected electrically and mechanically to a ground conductor constituted by the lead frame conductor by a conductor for grounding at a middle point of the antenna.

In order to make the rectified voltage generated at the rectenna circuit a constant voltage, according to the present invention, an LED (Light Emitting Diode) is introduced, and constant voltage formation of the circuit is achieved by utilizing the rapid rise of the forward direction voltage of the positive characteristic of the LED. Generated power increased as the wireless IC tag becomes proximate to an antenna of an interrogator, brings about an increase in current in the forward direction of the LED, increases light emitting intensity of the LED and the circuit maintains voltage applied on an IC circuit constituted by CMOS or the like at a predetermined value. The light emitting phenomenon at this occasion indicates that the interrogator makes access to the wireless IC tag or can make access thereto. At this occasion, the IC indicates a drivable state or a driving state and constitutes a criterion of in-operation of recognizing the wireless IC tag or finish of operation by a congestion control. Further, by setting and disposing a logic circuit in the IC circuit, the logic circuit can be used in various signals for positively controlling the light emitting state of the diode and knowing the state of the wireless IC tag via the logic circuit.

By press forming of a lead frame flat plate, the lead frame flat plate is formed in a shape of a cross having a connection